REMARKS

This is intended as a full and complete response to the Office Action dated August 21, 2009, having a shortened statutory period for response set to expire on November 23, 2009.

Claims 1, 24, 26 and 29 have been amended have been added to provide more clarity to the claimed invention. Applicants believe no new matter has been introduced by the amendments presented herein. The amendments have been presented to put the claims in condition for allowance or in better condition for an appeal. Please reconsider the claims pending in the application for reasons discussed below.

Telephone interviews were held on November 16, 2009 and November 22, 2009. Applicants would like to thank the Examiner for conducting the interviews. During the interviews, the Examiner agreed that the claims as amended are allowable over the prior art of record.

In the Office Action, claims 1-8, 17, 20, 23-27 and 29-34 stand rejected under 35 USC 103(a) as being unpatentable over Hybrid Seismic Inversion: A Reconnaisance Tool For Deepwater Exploration, 11/2000 by Mallick et al. (Mallick 2000) in view of US Patent No. 6,694,261 ("Huffman").

Mallick 2000 is generally directed to identifying gas hydrates by using a background P- to S-wave velocity ratio and analyzing anomalies from the ratio. However, Mallick 2000 does not teach or disclose: developing a geologic model of shallow water flow risk areas; performing a stratigraphic analysis on reflected P-wave seismic data of the geologic model to determine a control location within reflected P-wave seismic data; and applying a pre-stack full waveform inversion on the reflected P-wave seismic data at the control location to provide an elastic earth model of the shallow water flow risk areas based on the geologic model and the stratigraphic analysis, wherein the elastic earth model is determined by matching the reflected P-wave seismic data with synthetic seismic data of the geologic model and the elastic earth model comprises P-wave velocity and S-wave velocity, as recited in claim 1. Mallick 2000 certainly does not teach computing a ratio between the P-wave velocity

and the S-wave velocity, because the background ratio in Mallick 2000 is assumed to exist.

The Examiner states that Mallick 2000 does not teach the application of the technique to shallow water flow. The Examiner uses Huffman in an attempt to supplement this missing limitation. Huffman proposes using seismic data obtained from ocean bottom cables to identify a shallow water risk area. However, like Mallick 2000, Huffman also does not teach or disclose developing a geologic model of shallow water flow risk areas; performing a stratigraphic analysis on reflected P-wave seismic data of the geologic model to determine a control location within reflected P-wave seismic data; and applying a pre-stack full waveform inversion on the reflected P-wave seismic data at the control location to provide an elastic earth model of the shallow water flow risk areas based on the geologic model and the stratigraphic analysis, wherein the elastic earth model is determined by matching the reflected P-wave seismic data with synthetic seismic data of the geologic model and the elastic earth model comprises P-wave velocity and S-wave velocity. Furthermore, Huffman fails to teach identifying multiple shallow water flow risk areas using the relationship of the P-wave velocity to the S - wave velocity ratio with respect to seismic travel time, as recited in claim 1.

Mallick 2000 and Huffman also fail to teach processing reflected P-wave seismic data to enhance its stratigraphic resolution, wherein the reflected P-wave seismic data are obtained from marine towed streamers; selecting a control location comprising: performing a stratigraphic analysis on the reflected P-wave seismic data; and evaluating the seismic attributes of the reflected P-wave seismic data; applying a pre-stack full waveform inversion on the reflected P-wave seismic data at the control location to provide an elastic earth model of shallow water flow risk areas, wherein the elastic earth model is determined by matching the reflected P-wave seismic data with synthetic seismic data of the geologic model and the elastic earth model comprises P-wave velocity and S-wave velocity; and determining multiple shallow water flow risk areas using the relationship of the ratio between the P-wave velocity and the S-wave velocity with respect to seismic travel time, as recited in claim 26.

In addition to failing to teach developing a geologic model of the shallow water flow risk area; performing a stratigraphic analysis on only reflected P-wave seismic data

of the geologic model to determine a control location within the only reflected P-wave seismic data; applying a pre-stack full waveform inversion on the only reflected P-wave seismic data at the control location to provide P-wave velocity (Vp) and Poisson's ratio; and identifying the multiple shallow water flow risk areas using the relationship of the ratio (Vp/Vs) with respect to seismic travel time, Mallick 2000 and Huffman also fail to teach computing for S-wave velocity (Vs) using the P-wave velocity (Vp) and the Poisson's ratio, as recited in claim 29. In contrast, Huffman proposes measuring the S-wave velocity (Vs), rather than computing for it using the P-wave velocity (Vp) and the Poisson's ratio.

For these reasons, claims 1, 26 and 29 are patentable over Mallick 2000 and Huffman. Claims 2-8, 12-15, 17-25, 27 and 30-34 are also allowable over Mallick 2000 and Huffman. Withdrawal of the rejection is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the claimed invention. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

/Ari Pramudji/ November 23, 2009
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